

Monthly Marine Biotoxin Report

September 2014

Technical Report No. 14-18

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of September, 2014. Ranges of toxin concentrations are provided for the paralytic shellfish poisoning (PSP) toxins and for domoic acid (DA). Estimates are also provided for the distribution and relative abundance of *Alexandrium*, the dinoflagellate that produces PSP toxins, and *Pseudo-nitzschia*, the diatom that produces domoic acid. Summary information is also provided for any quarantine or health advisory that was in effect during the reporting period.

Please note the following conventions for the phytoplankton and shellfish biotoxin distribution maps: (i) All estimates for phytoplankton relative abundance are qualitative, based on sampling effort and percent composition; (ii) All toxin data are for mussel samples, unless otherwise noted; (iii) All samples are assayed for PSP toxins; DA analyses are performed as needed (i.e., on the basis of detected blooms of the diatoms that produce DA); (iv) Please refer to the appropriate figure key for an explanation of the symbols used on the maps.

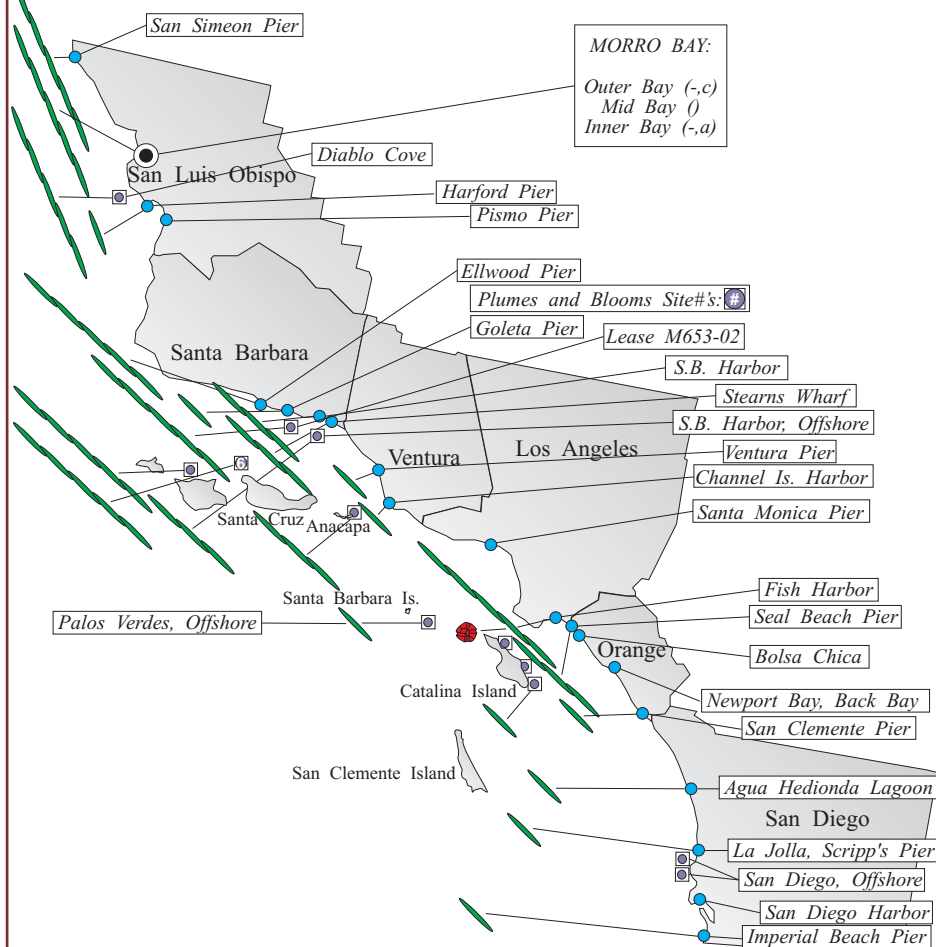
Southern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed at only one sampling site in southern California (Figure 1). The widespread occurrence of this dinoflagellate in August along the San Luis Obispo coast had disappeared by September. A small number of *Alexandrium* were observed at Fish Harbor (Los Angeles County) on

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Figure 1. Distribution of toxin-producing phytoplankton in Southern California during September, 2014.



Relative Abundance of Known Toxin Producers

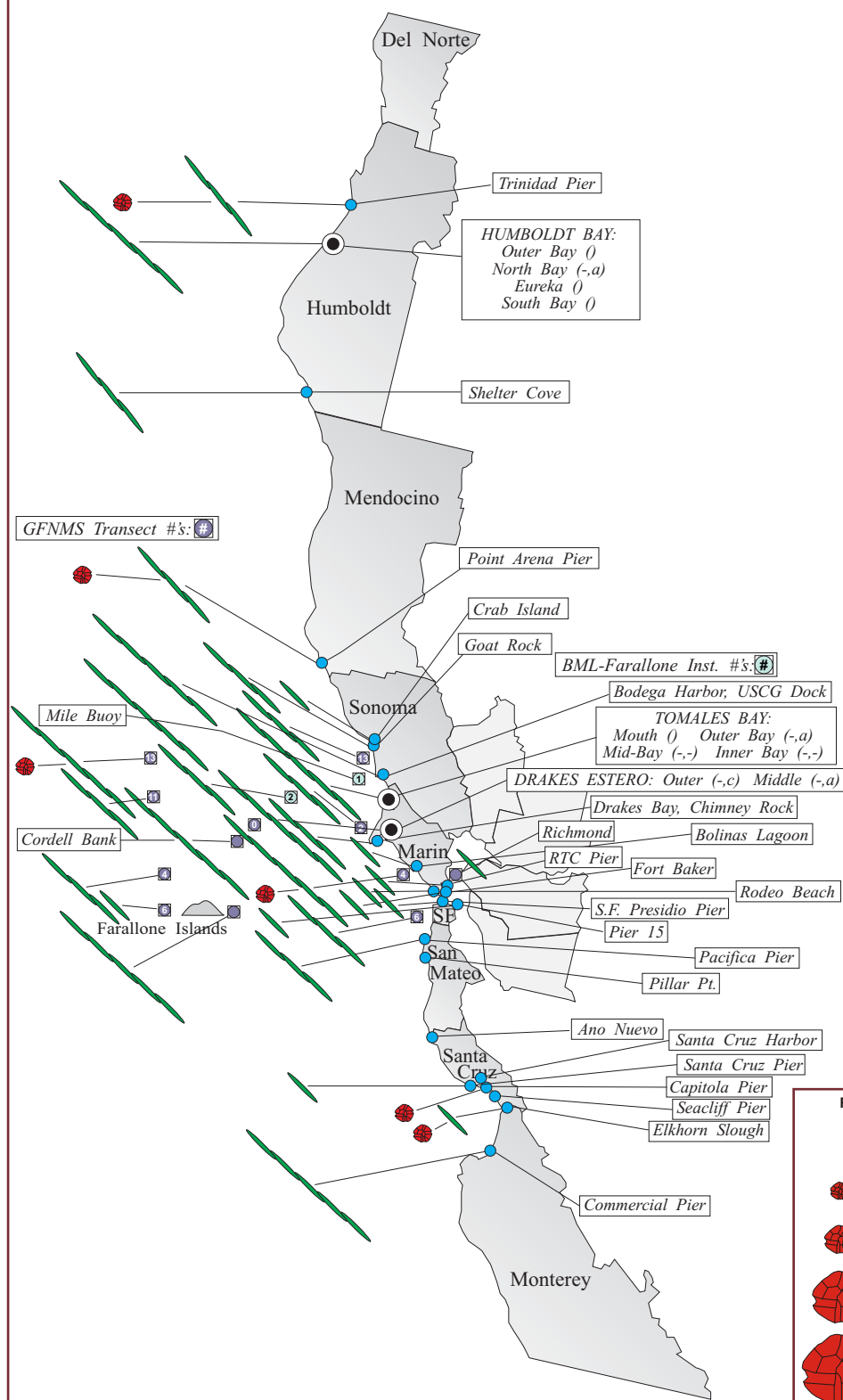
Alexandrium Species		Pseudo-nitzschia Species	
	Rare (less than 1%)		Present (less than 10%)
	Present (between 1% and 10%)		Common (between 10% and 50%)
	Common (between 10% and 50%)		Abundant (greater than 50%)
	Abundant (greater than 50%)		

MONTHLY SAMPLING STATIONS:

For areas with multiple sampling stations, species abundance at each station is represented as follows:
(a,p) = Abundance for *Alexandrium* and *Pseudo-nitzschia*.
e.g., (c,p) = common, present; (a,-) = abundant, not observed

- Single Sampling Station
- Multiple Sampling Stations
- Offshore Sampling Station

Figure 2. Distribution of toxin-producing phytoplankton in Northern California during September, 2014.



(Continued from Page 1)

September 30. PSP toxins were not detected in any samples during September (Figure 3).

Domoic Acid

Pseudo-nitzschia was observed along the entire southern California coast (Figure 1). The percent composition of this diatom remained abundant at sampling stations in San Luis Obispo and Santa Barbara counties, but did decline at some sites in Santa Barbara and Ventura counties. *Pseudo-nitzschia* also increased at Fish Harbor (Los Angeles County) and was abundant by September 30. The cell mass remained low at most locations. The highest relative abundances were observed at Diablo Cove (September 11) and inside Morro Bay (September 2).

Domoic acid was detected in samples of lobster viscera, also known as lobster tomalley (Figure 3). The concentration of toxin detected was well above the 20 ppm alert level just offshore of Ventura Harbor. Domoic acid was also detected offshore near Anacapa Island but was below the alert level.

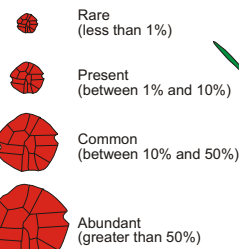
Non-Toxic Species

The diatom *Chaetoceros* remained common to abundant along the southern California coast. *Hemialus* was also common to abundant at sites between Santa Barbara and San Diego counties. The dinoflagellate *Ceratium furca* was common at some sites along the southern California coast and

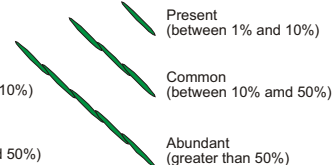
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Relative Abundance of Known Toxin Producers

Alexandrium Species



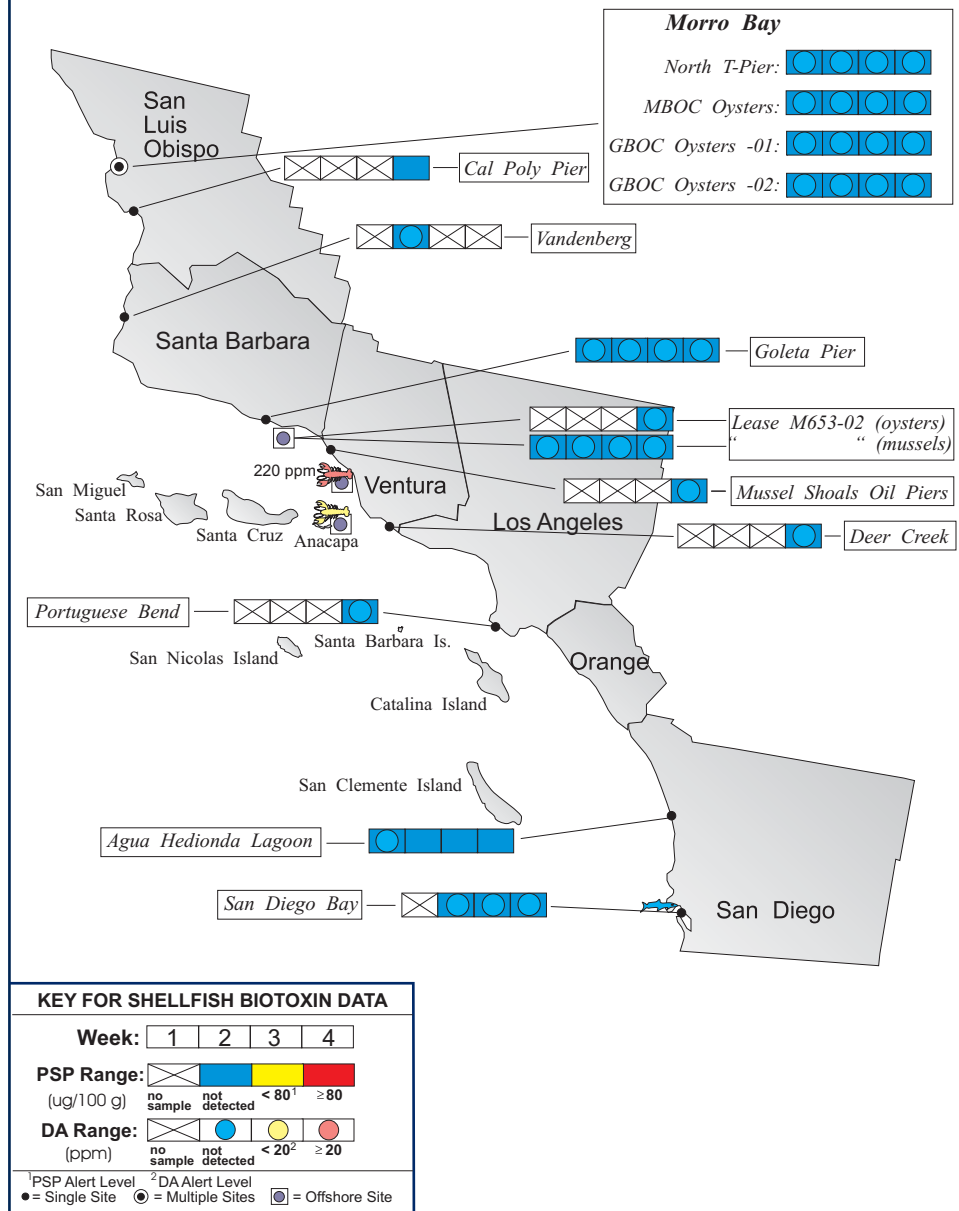
Pseudo-nitzschia Species



For areas with multiple sampling stations, species abundance at each station is represented as follows:

(A,P) = Abundance for *Alexandrium* and *Pseudo-nitzschia*.
e.g., (c,p) = common, present; (a,-) = abundant, not observed

Figure 3. Distribution of shellfish biotoxins in Southern California during September, 2014.



(Continued from Page 2)

Cochlodinium was abundant at Hartford Pier (San Luis Obispo County).

Northern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed at several sampling sites between Humboldt and Monterey counties (Figure 2). Cell numbers were low at all sites.

Low concentrations of PSP toxins were detected at sites between Del Norte and Mendocino counties (Figure 4). Low concentrations of toxins persisted at sentinel mussel stations inside Humboldt Bay through the third week of the month before declining below the detection limit.

Domoic Acid

Pseudo-nitzschia was observed along the entire northern California coast in September (Figure 2). This diatom increased significantly in percent composition at sites between southern Mendocino and northern San Mateo counties. The highest relative abundances of *Pseudo-nitzschia* were observed offshore at the Bodega Marine Laboratory buoy (September 9), inside Bodega Harbor at the USCG sentinel mussel station (September 4), at the Drakes Bay sentinel mussel station (September 4), and inside Humboldt Bay (September 23). Despite the elevated abundance of *Pseudo-nitzschia*,

(Continued on Page 4)

The Marine Biotoxin Monitoring and Control Program, managed by the California Department of Public Health, is a state-wide effort involving a consortium of volunteer participants. The shellfish sampling and analysis element of this program is intended to provide an early warning of shellfish toxicity by routinely assessing coastal resources for the presence of paralytic shellfish poisoning (PSP) toxins and domoic acid.

The Phytoplankton Monitoring Program is a state-wide effort designed to detect toxin producing species of phytoplankton in ocean water before they impact the public. The phytoplankton monitoring and observation effort can provide an advanced warning of a potential toxic bloom, allowing us to focus sampling efforts in the affected area before California's valuable shellfish resources or the public health is threatened.

For More Information Please Call:
(510) 412-4635

For Recorded Biotoxin Information Call:
(800) 553-4133

(Continued from Page 3)

domoic acid was not detected in any shellfish samples during September.

Non-Toxic Species

Rhizosolenia and *Skeletonema* were the dominant diatom genera at sites in Humboldt County, while *Chaetoceros* dominated the remainder of the northern California coast. The dinoflagellate *Prorocentrum micans* was common along most of the coast and *Ceratium furca* was common at sites between San Mateo and Monterey counties.



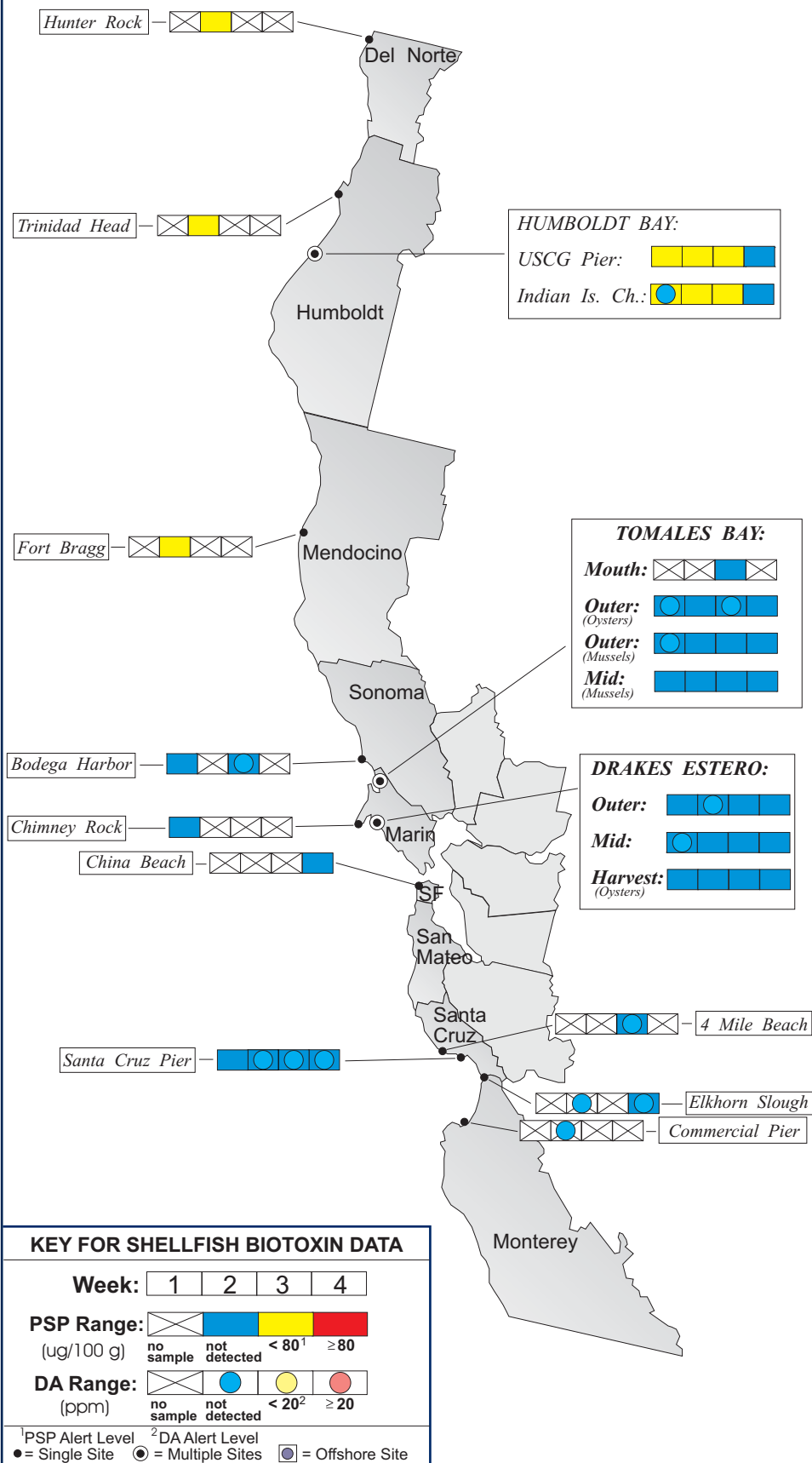
QUARANTINES:

On July 11 CDPH lifted the April 4 and April 28, 2014 health advisories warning consumers not to eat recreationally harvested bivalve shellfish or the internal organs of commercially or recreationally caught anchovy, sardines, or crab taken from Monterey and Santa Cruz counties.

The annual mussel quarantine began on May 1 and is scheduled to be rescinded at midnight on October 31. This annual quarantine applies to sporharvested mussels along the entire California coastline, including all bays and estuaries. The quarantine does not apply to certified commercial shellfish companies, which are monitored closely and required to submit frequent samples for toxin testing.

Consumers of Washington clams, also known as butter clams (*Saxidomus nuttalli*), are cautioned to eat only the white meat. Washington clams can concentrate the PSP toxins in the viscera and in the dark parts of the siphon and can remain toxic for a long period of time. Persons taking scallops or clams, with the exception of razor clams, are advised to

Figure 4. Distribution of shellfish biotoxins in Northern California during September, 2014.



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Table 1. Program participants collecting phytoplankton samples during September, 2014. (Continued from Page 4)

AGENCY	#	AGENCY	#
DEL NORTE COUNTY			
None Submitted			
HUMBOLDT COUNTY			
		Bureau of Land Management	1
Coast Seafood Company	5	Humboldt State University Marine Lab	3
MENDOCINO COUNTY			
		CDPH Volunteer (<i>Marie DeSantis</i>)	3
SONOMA COUNTY			
Bodega Marine Lab	3	Sonoma Coast Watch	2
CDPH Marine Biotoxin Program	2	Gulf Farallones National Marine Sanctuary	5
MARIN COUNTY			
		CDPH Marine Biotoxin Program	2
CDPH Volunteers (<i>Anderson, Clyde</i>)	3	Cordell Banks National Marine Sanctuary	1
Drakes Bay Oyster Company	8	Hog Island Oyster Company	4
Gulf Farallones National Marine Sanctuary	6	Golden Gate National Recreation Area	1
NatureBridge	3	SFSU, Romberg Tiburon Center	2
SAN FRANCISCO COUNTY			
		Exploratorium	4
CDPH Volunteer (<i>Eugenia McNaughton</i>)	5	Gulf Farallones National Marine Sanctuary	3
		San Francisco Bay Whale Watch	1
SAN MATEO COUNTY			
San Mateo County Environmental Health Dept.	2	U.C. Santa Cruz - Ano Nuevo	1
The Marine Mammal Center (<i>Stan Jensen</i>)	5	Friends of the Sea Otter (<i>Diane Larson</i>)	2
SANTA CRUZ COUNTY			
		U.C. Santa Cruz	4
Santa Cruz Co. Environmental Health Dept.	3	San Lorenzo Valley High School	1
MONTEREY COUNTY			
		CDPH Volunteer (<i>Jerry Norton</i>)	1
Monterey Abalone Company	2	Friends of the Sea Otter (<i>Janis Chaffin</i>)	2
SAN LUIS OBISPO COUNTY			
Morro Bay National Estuary Program	1	Morro Bay Oyster Company	5
Coastal Discovery Center, San Simeon	2	Tenera Environmental	4
Friends of the Sea Otter (<i>Kelly Cherry</i>)	2	CDPH Volunteers (<i>Al Guild, Vince Shay</i>)	4
SANTA BARBARA COUNTY			
		CDPH Volunteer (<i>Sylvia Short</i>)	4
HABNet/CDPH Volunteer (<i>Amiri</i>)	2	Santa Barbara Mariculture Company	5
Santa Barbara Channel Keeper	2	U.C. Santa Barbara	4
VENTURA COUNTY			
		National Park Service	1
CDPH Volunteer (<i>Fred Burgess</i>)	3		
Ventura County Environmental Health Dept.	1		
LOS ANGELES COUNTY			
		Catalina Island Marine Institute	5
Tole Mour	3	Southern California Marine Institute	1
Los Angeles County Sanitation District	2	CDPH Volunteers (<i>Cal Parsons, Kai Xu</i>)	3
ORANGE COUNTY			
California Department of Fish and Wildlife	4	National Oceanic and Atmospheric Admin.	1
CDPH Volunteer (<i>Truong Nguyen</i>)	4	Amigos de Bolsa Chica	3
SAN DIEGO COUNTY			
		Sea Camp/HABNet	1
Scripps Institute of Oceanography	4		
U.S. Navy Marine Mammal Program	4	Tijuana River National Estuary Research	4

remove and discard the dark parts (i.e., the digestive organs or viscera). Razor clams (*Siliqua patula*) are an exception to this general guidance due to their ability to concentrate and retain domoic acid in the edible white meat as well as in the viscera.

PSP toxins can produce a tingling around the mouth and fingertips within a few minutes to a few hours after eating toxic shellfish. These symptoms can be followed by disturbed balance, lack of muscular coordination, slurred speech and difficulty swallowing. In severe poisonings, complete muscular paralysis and death from asphyxiation can occur.

Symptoms of domoic acid poisoning can occur within 30 minutes to 24 hours after eating toxic seafood. In mild cases, symptoms of exposure to this nerve toxin may include vomiting, diarrhea, abdominal cramps, headache and dizziness. These symptoms disappear completely within several days. In severe cases, the victim may experience excessive bronchial secretions, difficulty breathing, confusion, disorientation, cardiovascular instability, seizures, permanent loss of short-term memory, coma and death.

Any person experiencing any of these symptoms should seek immediate medical care. Consumers are also advised that neither cooking or freezing eliminates domoic acid or the PSP toxins from the shellfish tissue. These toxins may also accumulate in the viscera of seafood species such as crab, lobster, and small finfish like sardines and anchovies, therefore these tissues should not be consumed. Contact the "Biotoxin Information Line" at 1-800-553-4133 for a current update on marine biotoxin activity prior to gathering and consuming shellfish.

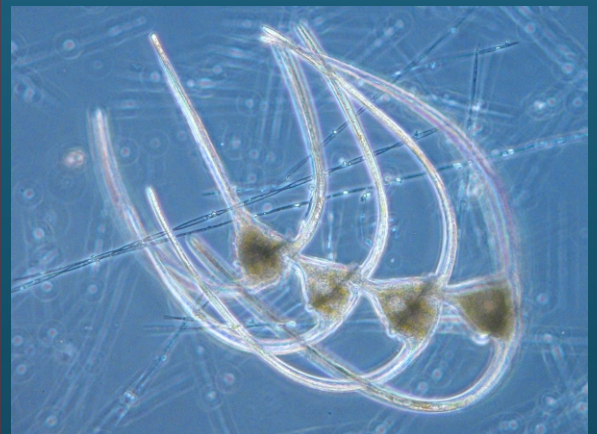
Table 2. CDPH program participants submitting shellfish samples during September, 2014.

COUNTY	AGENCY	#
Del Norte	None Submitted	
Humboldt	Coast Seafood Company	6
	Humboldt County Environmental Health Department	1
Mendocino	Mendocino County Environmental Health Department	1
Sonoma	CDPH Marine Biotoxin Program	2
Marin	Cove Mussel Company	3
	Drakes Bay Oyster Company	12
	CDPH Marine Biotoxin Program	1
	Hog Island Oyster Company	3
	Tomales Bay Oyster Company	4
San Francisco	None Submitted	
San Mateo	None Submitted	
Santa Cruz	U.C. Santa Cruz	4
	CDPH Volunteer (<i>Michael Wolcott</i>)	1
Monterey	CDPH Volunteers (<i>Holst, Neylan, Mooers</i>)	3
San Luis Obispo	Grassy Bar Oyster Co.	13
	Morro Bay Oyster Company	7
Santa Barbara	Santa Barbara Mariculture Company	7
	U.C. Santa Barbara	4
	Vandenberg AFB	1
Ventura	Ventura County Environmental Health Department	2
	CDPH Volunteers (<i>Peter Weinerth, Nick Atschley</i>)	2
Los Angeles	Los Angeles County Health Department Torrance	1
Orange	None Submitted	
San Diego	Carlsbad Aquafarms, Inc.	2
	U.S. Navy Marine Mammal Program	5

PHYTOPLANKTON GALLERY



The diatom *Rhizosolenia* was common at sites in Humboldt County.



The dinoflagellate *Ceratium macroceros* is most commonly observed at sites offshore of southern California. Note the mass of *Pseudo-nitzschia* cells in the background.



Two common dinoflagellates that can occur anywhere along the California coast are *Protoperdinium* (left) and *Ceratium divaricatum* (right).